

Institute for Theoretical Sciences - A Joint Institute of Argonne National Lab and the University of Notre Dame

Scientific Achievement

The Institute for Theoretical Sciences (ITS), established jointly by ANL and ND in May 2004, is an outgrowth of the Summer Visitor Programs organized within MSD by G.W. Crabtree W.-K. Kwok and B. Janko between 1998 and 2004. The Institute sponsors the following activities: individual visits by preeminent scholars, visitor groups focused on current problems of major interest, as well as workshops. During the 2005 academic year ITS hosted - among others - a short visit by Sir Anthony Leggett, a one month long visitor program of Prof. Jainendra Jain focused on fractional quantum Hall phenomena in rotating Bose condensates, and a workshop on the prospects of room temperature superconductivity (RTS). The RTS workshop featured talks by many leading theorists and experimentalist, such as Alexei Abrikosov, Neil Ashcroft and Paul Chu.

Significance

Institutes for advanced study played a decisive role in the spectacular progress of theoretical sciences over the past decades. Modern quantum theory, for example, would be unimaginable without the landmark results of the so-called Copenhagen School, the intellectual powerhouse that is now the Niels Bohr Institute. The main driving force behind all successful institutes is the *visiting scientists*. For a relatively short period of time, it is possible to form *a critical mass* of experts in a particular area and to make substantial progress.

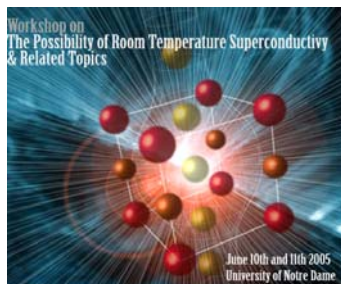
There are several immediate and substantial benefits of a thriving ITS jointly hosted by the University of Dame and Argonne National Laboratory. The main benefits are:

1. *Most effective catalyst for novel research projects:*
The visitor programs are designed to complement the expertise of ND and ANL researchers. We have documented with our ANL visitor program that the collaborative work between the visitors and the researchers at the host institutions continues over a period that extends well beyond the duration of the visit.
2. *Scientific flexibility in topics and participants*
The focus topics of the research activities and the participating visiting scientists will be more diverse than what any department at ND or division at ANL could support on a long term.
3. *High Impact/Increased visibility for ND & ANL*
It is our experience that by attracting the movers and shakers of a field, the short, but intense period of research at the Institute generates several high profile papers with unusually high frequency.
4. *Promotes the host institutions*

Performers

G. Crabtree(ANL-MSD), W.-K. Kwok (ANL-MSD), B. Jankó (UND)

Workshop: Room Temperature Superconductivity



The Possibility of Room Temperature Superconductivity & Related Topics Workshop featured talks by many leading theorists and experimentalist, such as Alexei Abrikosov, Mohit Randeria, Neil Ashcroft and Paul Chu.

2006 ITS Visiting Fellows

Alan Luther

TOPIC: Fermionic Susceptibilities in quasi 1-D systems

Francois Peeters

TOPIC: Mesoscopic and Nanoscale Superconductivity & Magnetism



2005 ITS Visiting Fellows

Jainendra K. Jain

TOPIC: Emergence of fractional Hall type structures in rapidly rotating BEC systems



Imre Kondor

TOPIC: Applying the methods of statistical physics to problems in quantitative finance, risk management and financial regulation

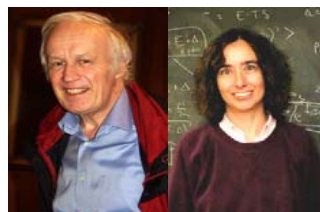


Masashi Tachiki

TOPIC: Terahertz radiation emitted by Josephson vortices in HTSC



Recent ITS Guests



ITS hosts visiting scientist to speak at Notre Dame and Argonne National lab. IN 2005 these guests included Anthony J. Leggett and Susan N. Coppersmith